

# **Review Paper: Oral rehabilitation after radiotherapy; a review on prosthetic treatment options**



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## **ABSTRACT**

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**Introduction:** Head and neck radiotherapy has some intraoral side effects that affect the treatment planning for oral rehabilitation. Some treatment options have been discussed in articles. Choosing the best treatment should be based on the patient's oral conditions affected by radiotherapy.

### **Keywords:**

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## Introduction

Many patients with head and neck cancers receive maxillofacial radiotherapy (RT) that have some side effects, they also may require intraoral reconstructive treatment after RT. Most

Common intraoral side effects of RT are: xerostomia, mucositis, tooth decay and osteoradionecrosis. Side effects can reduce success of treatment and increase prosthetic complications (1)

The restorative dentist is an important member of a multi-disciplinary team whose help to diagnose manage and rehabilitate patients who have received radiotherapy. Dental assessment and treatment is important both before and after radiotherapy. (2,3)

There are some recommendations by dentist before radiotherapy such as tooth extraction, endodontic and restorative treatment, repair of removable prosthesis and radiotherapy shield to retract tissues. All of these are important to prevent trauma and reduce risk of osteoradionecrosis. Dental hygienist should provide regular visits with patient to help reducing the side effects of radiotherapy to the oral tissues. (4)

Oral rehabilitation after radiotherapy is in correlation with patient-related factors such as age,

Patients preferences and awareness, level of oral hygiene and cancer, and cancer clinical staging and tumor location, mode, dose and field of radiotherapy, and the immediacy of treatment. (5)

Based on literature, Oral rehabilitation in irradiated patient, could be divided into three main categories:

Implant supported prosthesis, removable prosthesis, tooth supported prosthesis.

Most articles considered oral rehabilitation with implant supported prosthesis after radiotherapy, but up to our research there isn't any literature discuss all types of prosthodontic options, therefore, the purpose of this article is to review literatures that have addressed this issue.

## Review

### *Implant supported prosthesis:*

Depending on the patient's condition,

implant treatment is available from single tooth replacement to the full mouth as fixed or movable prosthesis.

Radiotherapy isn't considered as a contraindication for implant insertion. However, the waiting period of 13 to 24 months after radiotherapy is recommended. The success rate of treatment in irradiated mandibles was similar to the success rate in the areas of jaw that did not receive radiotherapy. (6)

Shaw et al concluded that Mandibular implants were more successful and with the exception of a few soft tissue problems, most patients have successful prosthetic treatment, more failures were detected with bone grafted implants and maxillary implants. Radiotherapy does not appear to have a negative effect on implant longevity. It seems hyperbaric oxygen has not been of much benefit. (7)

For better osteointegration, loading of the prosthesis should be delayed for six months instead of the traditional three to four months for mandible. (8, 9)

It is also recommended that primary placement of implants before radiotherapy leads to predictable osteointegration. (10,11) This is advantageous because initial implant healing osseointegration before irradiation has the reduced risk of osteoradionecrosis (12,13). However, there is a risk of inappropriate implant positioning, which leads to inappropriate prosthodontics treatment. (14, 15)

### *Removable tooth and/or tissue supported prosthesis:*

Removable partial or complete denture is common treatment for oral rehabilitation,

It is especially suitable for replacing lost tissues in patients who have received tumor resection treatment.

Radiotherapy reduces the amount of saliva and due to the vascular changes that occur, the patient's mucosa becomes atrophic and sensitive and prone to ulcers.

Considering these conditions, to avoid causing trauma, Oelgisser et al advised, it is

better to prevent the administration of removable dentures to the patient to avoid soft tissue damage and bone exposure and osteonecrosis, so fixed prostheses are preferred. (16)

Gerngross et al found that post-prosthesis insertion complications in patients who had received complete denture after radiation therapy were 1.7 times more than others, while most of these patients had greater than 5000 cGy. (17)

Curtis et al believed removable prosthesis are acceptable with some consideration in irradiated patients :Use of non-pressure technique and spaced trays for impression making ,use of monoplane teeth, instruction to patient to remove denture during night and when detecting soreness ,removing rough projection from tissue surface and use of soft liners . (18)

#### ***Fixed tooth supported prosthesis:***

Because caries is a common complication of radiotherapy, restorative treatment such as Post and crown, endocrown and onlay is needed .Brauner et al believed that fixed tooth supported prosthesis is better than removable because of lower risk of soft tissue ulceration (19)

Due to the high risk of tooth decay and soft tissue inflammation around fixed prosthesis, tooth supported prosthesis should be selected based on less complexity and accessibility for examination in follow-up sessions (1)

Tooth with questionable prognosis should be extracted up to 10-14 days before radiotherapy because after radiotherapy the teeth are prone to recurrent radiation caries and gingiva is inflamed due to mucositis (15, 20)

In patient who have low motivation and ability regarding oral hygiene and in situation where there is no possibility of supragingival margin for fixed prosthesis, it is better to extract teeth and consider implant supported prosthesis. (21)

A consultation with a dentist should be continued before ,during and after radiotherapy. (22)About half of the patients who consult a dentist before radiotherapy are not monitored after radiotherapy .(23) This leads to the failure of prosthetic treatments so the choice of appro-

priate treatment should be based on the patient's oral hygiene condition and patient motivation.

Articles have addressed different dental condition of patient with different dose and site for radiation therapy and also various prosthetic treatment options. There is a need for more articles that compared irradiated patients who received different types of removable dentures and fixed dental prostheses, also a systematic review in this field is needed

## **Conclusion**

Choosing the right treatment plan should be based on the patient's condition. Oral hygiene situation ,dose of radiation and period of time that passes after that, quality and quantity of available teeth affect treatment planning.

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